

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-27 (cancelled).

28. (currently amended) A manufacturing method for a semiconductor device, comprising the steps of:

(a) forming a first semiconductor region of a first conductivity type over a semiconductor substrate;

(b) depositing a first insulation film over a main surface of said semiconductor substrate;

(c) depositing a first semiconductor film of a second conductivity type opposite to said first conductivity type over said first insulation film;

(d) depositing a third insulation film of a kind different from said first insulation film over said first semiconductor film;

(e) depositing a fifth insulation film capable of taking an etching selective ratio to said third insulation film over said third insulation film;

(f) opening portions of said fifth insulation film and third insulation film by an etching method using a photoresist film as an etching mask;

(g) removing said photoresist film, and thereafter removing said first semiconductor film exposed from the opening by using said fifth insulation film as an etching mask to form a first opening portion in said third and fifth insulation films and said first semiconductor film;

(h) forming a sixth insulation film of a kind different from said first insulation film over a side surface of said first opening portion;

(i) forming, over said first insulation film, a second opening portion in which a surface opposite to the main surface of said semiconductor substrate and said first semiconductor region in said first semiconductor film are exposed, by selectively etching a portion of said first insulation film through said first opening portion using said third insulation film and sixth insulation film as etching masks; and

(j) forming a semiconductor film in said second opening portion,

wherein said semiconductor film is formed by joining a second semiconductor film growing from a surface exposed from said second opening portion of said first semiconductor

film and a third semiconductor film growing from the main surface of said semiconductor substrate,

wherein said second semiconductor film is a poly crystal and said third semiconductor film is a single crystal, and

whereinWherein, during a processing for forming said first opening portion, an amount in which a portion of said first insulation film exposed from said first opening portion is etched and a protrusion amount of said sixth insulation film protruding from a surface opposite to the main surface of said semiconductor substrate toward the main surface of said semiconductor substrate in said first semiconductor film are each set to be equal to or smaller than one half of thickness of said first insulation film.

29. (original) The manufacturing method for a semiconductor device according to claim 28, further comprising the steps of:

(k) depositing a seventh insulation film over the main surface of said semiconductor substrate after said step (j);
and

(l) forming a fifth semiconductor film of the first conductivity type via said sixth and seventh insulation

films over the side surface of said first opening portion by a dry-etching method.

30. (currently amended) The manufacturing method for a semiconductor device according to claim 29, further comprising:

(m) removing, by the wet-etching method, said seventh insulation film exposed from said fifth semiconductor film in said first opening portion after the step (l), and forming a third opening portion from which a portion of said third semiconductor film in said seventh insulation film is exposed; and

(n) forming a sixth semiconductor film contacting with said semiconductor film and insulated from said first semiconductor film after said step (m).

31. (original) The manufacturing method for a semiconductor device according to claim 30,

wherein said first semiconductor region is a collector region of a bipolar transistor, said first semiconductor film is a base electrode of said bipolar transistor, and said sixth semiconductor film is an emitter electrode of said bipolar transistor.

32. (original) The manufacturing method for a semiconductor device according to claim 28,

wherein said first and fifth insulation films are made from silicon oxide films and said third insulation film and sixth insulation film are made from silicon nitride films.

33. (original) The manufacturing method for a semiconductor device according to claim 28,

wherein said semiconductor film is made from a material containing primarily a semiconductor of a kind different from said semiconductor substrate.

34. (original) The manufacturing method for a semiconductor device according to claim 33,

wherein said semiconductor film is made from a material containing primarily silicon-germanium.

Claims 35-36 (cancelled).

37. (original) The manufacturing method for a semiconductor device according to claim 28,

wherein said fifth insulation film is made from an insulative material of the same kind as said first insulation film.

38. (currently amended) A manufacturing method for a semiconductor device, comprising the steps of:

(a) forming a collector region of a first conductivity type of a bipolar transistor over a semiconductor substrate;

(b) depositing a first insulation film made from a silicon oxide film over a main surface of said semiconductor substrate;

(c) depositing a first semiconductor film that is a conductive film for forming said bipolar transistor over said first insulation film, the first semiconductor film being for forming a base electrode of a second conductivity type opposite to said first conductivity type;

(d) depositing a third insulation film made from a silicon nitride film over said first semiconductor film;

(e) depositing a fifth insulation film made from a silicon oxide film over said third insulation film;

(f) opening portions of said fifth insulation film and third insulation film by an etching method using a photoresist film as an etching mask;

(g) removing said photoresist film, thereafter removing said first semiconductor film exposed from the opening by using said fifth insulation film as an etching mask, and forming a first opening portion in said third and fifth insulation films and said first semiconductor film;

(h) forming a sixth insulation film made from a silicon nitride film over a side surface of said first opening portion;

(i) forming, in said first insulation film, a second opening portion, from which a surface opposite to the main surface of said semiconductor substrate and said collector region in said first semiconductor film are exposed, by selectively etching a portion of said first insulation film through said first opening portion using said third insulation film and sixth insulation film as etching masks; and

(j) forming, in said second opening portion, a second polycrystalline semiconductor film growing from a surface exposed from said second opening portion of said first semiconductor film and forming a link base of said bipolar transistor and a third single crystalline semiconductor film growing from the main surface of said semiconductor substrate and forming a true base region and emitter region of said bipolar transistor, by an epitaxial growth method so that they are joined to each other,

Wherein ~~wherein~~, during a processing for forming said first opening portion, an amount in which a portion of said first insulation film exposed from said first opening portion is exposed and a protrusion amount of said sixth

insulation film protruded from a surface opposite to the main surface of said semiconductor substrate toward the main surface of said semiconductor substrate in said first semiconductor film are equal to or smaller than one half of thickness of said first insulation film.

39. (original) The manufacturing method for a semiconductor device according to claim 38, further comprising the steps of:

(k) depositing a seventh insulation film over the main surface of said semiconductor substrate after said step (j); and

(l) forming a fifth semiconductor film of the first conductivity type via said sixth insulation film and seventh insulation film over the side surface of said first opening portion by a dry-etching method.

40. (currently amended) The manufacturing method for a semiconductor device according to claim 39, further comprising the steps of:

(m) removing, in said first opening portion, said seventh insulation film exposed from said fifth semiconductor film by the wet-etching method after said step (l), and forming a third opening portion, from which a

portion of said ~~three~~third semiconductor film is exposed,
over said seventh insulation film; and

(n) forming a sixth semiconductor film for forming the
emitter electrode, which contacts with said third
semiconductor film and is insulated from said first
semiconductor film after said step (m).

Claims 41-44 (cancelled).